

FINAL CLOSE-OUT REPORT
FIVE SITES CENTERVILLE AREA
MONT A/E 87-46-105

FOR

DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU
HELENA, MONTANA

BY

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I. INTRODUCTION

The Five Sites - Centerville area project included the following sites in the vicinity of the community of Centerville in Cascade County, Montana.

Prill #1, #2, and Tracy Adit - These sites contained three individual mines located along the ridge overlooking Highway 227. The mines were located in Sections 1 & 12, T19N, R4E. The total area involved in the sites was about 1.6 acres, most of which was covered with coal slack. The main problems at the sites were the hazardous open mine adits that were attracting the attention of the local children. The coal wastes were also highly visible from the road below the sites.

The objectives of the project included permanently sealing the mine openings, restoring the coal waste piles to a natural state and removal of all previous mine disturbances.

Centerville 20 (Knox) - The Knox site was located high on a sandstone outcrop above several homes located in Section 20, T19N, R5E. The total area involved in the site was 1.7 acres, most of which was either covered with slack or seepage scars.

The site had a problem with acid mine drainage seeping out along the area near the mine adit. There was also a substantial slack pile and various debris. The major objectives of the project included collecting the acid mine water underground and piping it to a nearby drainage, removing the slack, and reclaiming all disturbed surface areas.

Senior Center - The Senior Center site consisted of several mines located along the hill behind the Centerville Senior Citizens Center. The sites covered an area of approximately 3 acres. The site was partially reclaimed several years ago under a different project. The mines are located in Sections 18 & 19, T19N, R5E.

The main problem at the Senior Center site was the acid mine discharge that had developed along the hill at the elevation of the mine. The discharge was killing the vegetation below the mines, causing erosion of the hillside, and creating serious sedimentation problems in the borrow ditches adjacent to the highway below. The Senior Center had a runoff diversion ditch above it that was almost silted in due to the sediment carried from the seepage area. The site also contained several open adits, coal slack piles, and miscellaneous debris.

The objectives of the project included: collecting all of the acid mine discharge on the site and treating a portion of it, permanently sealing all mine openings, and reclaiming all surface disturbances and trash areas.



Waste Site/Park Area - This site consisted of two reclamation areas; a coal waste pile in Section 18, T19N, R5E, and a waste disposal area close to Centerville in Section 20, T19N, R5E. The disposal area included an old football field belonging to the Centerville School. The Community of Centerville had formed a park board dedicated to promoting and building a park facility for the local residents. The Department of State Lands worked with the Board in an effort to transform the disposal area into a suitable park site. The goal was to use the coal waste piles to fill the large gullies on the park site (approximately 5.5 acres) and then topsoil, grade, and reseed the area. The park project was beneficial to all parties concerned and provided a convenient and nearby waste area for the slack.



II. DESCRIPTION OF RECLAMATION CONTRACT

A. CONTRACT DATA

Prebid Date August 11, 1987

Bid Date August 25, 1987

Lowest Bidders

1. Shumaker Trucking & Excavating
Great Falls, Montana Bid - \$108,988.75
2. Swan & Sons, Inc.
Anaconda, Montana Bid - \$110,055.60
3. Gordon Construction Co.
Great Falls, Montana Bid - \$125,500.35

Notice of Award Date / August 27, 1987

Notice to Proceed Date September 8, 1987

Pre-Construction Date September 8, 1987

Dates of Actual Work
Sept. 8 - Nov. 13
Dec. 2 - Dec. 4
Dec. 14 - Dec. 15

Completion Date December 15, 1987

DSL Inspector Mr. Mike Hiel

Project Engineer Mr. Rich West

Project Inspectors Mr. Tom Ward
Mr. Jim Gold



II. DESCRIPTION OF RECLAMATION CONTRACT (CONT'D)

B. EQUIPMENT AND METHODS USED ON THE PROJECT

The Contractor used standard earthwork and excavation equipment and methods for most of the project construction. An excavator and backhoe were used to complete all trench excavation for the drains and culverts. Standard 12 yard end dump trucks were used to haul the slack and topsoil onto the project. A D-8 dozer was used for topsoil stockpiling, slack contouring, and topsoil spreading. A road grader was used to do the finish grading at the park site.

The seeding was done using three different methods: A John Deere hoe drill, a Brillion grass seeder, and by hand broadcasting and tracking. The Brillion seeder did a superior job of seeding compared to the hoe drill. The hoe drill was difficult to adjust for depth of seed placement and on uneven ground tended to gouge too deep.

Grass hay mulch was used on this project. The Contractor spread the hay with an agricultural "hay buster" or manually by hand in the steeper areas. The hay was then tugged with a commercial crimper in most flat areas and tracked with cat grousers on the steeper slopes.

List of Equipment Used on the Project

<u>Type</u>	<u>Model & Manufacturer</u>	<u># of Units</u>
Wheel Loader	Caterpillar 966	1
Track Loader	Caterpillar 977K	1
Small Loader	Walden 6000	1
Wheel Loader	Caterpillar 988	1
Excavator	Drott 50	1
Excavator	Caterpillar EL180	1
Backhoe	Case 580 C	1
Patrol	Caterpillar 12F	1
Backhoe	John Deere	1
Patrol	Caterpillar 140G	1
Track Tractor	Caterpillar D-8	1
Track Tractor	Caterpillar D-6	1
Track Tractor	Caterpillar D-4	1
26 yd. Belly Dump	International	1
12 yd. End Dump	Miscellaneous	3
18 yd. End Dump	International	1
Crimper	Bowie	1
Hoe Drill	John Deere GL	1
Grass Seeder	Brillion	1
Farm Disc	Ford	1
Hay Spreader	Hay Buster	1
Farm Tractors	JD, Ford, Case	3
Water Truck		
Tool Van		
Fuel truck		



III. COST SUMMARY

A. SITE BREAKDOWN

	<u>Original Bid Price</u>	<u>Change Order #1</u>	<u>Total Site Cost</u>
Prill #1 & Tracy Adit	3,120.00	601.00	3,721.00
Prill #2	6,955.00	177.00	7,132.00
Centerville 20 (Knox)	30,862.50	2,494.00	33,356.50
Senior Center	34,750.00	11,522.00	46,272.00
Waste Site/Park Area	33,301.25	13,905.25	47,206.50
<u>Project Total</u>			\$137,688.00

B. CONSTRUCTION ITEM COST BREAKDOWN

<u>ITEM</u>	<u>UNIT</u>	<u># OF UNITS COMPLETED</u>	<u>EST. COST PER UNIT</u>	<u>TOTAL COST</u>
Contour slack	C.Y.	2,700	\$ 0.50	\$ 1,350.00
Topsoil	C.Y.	8,923	3.01	26,862.00
Slack Removal	C.Y.	16,163	2.84	46,023.00
Site Grading	Acre	5.50	100.00	550.00
Backfill Adit	EA.	9	266.66	2,400.50
Riprap Ditch	L.F.	880	8.35	7,345.00
Type I Ditch	L.F.	1,590	0.79	1,255.00
Type II Ditch	L.F.	410	14.00	5,740.00
Seepage Collector	L.F.	410	26.75	10,970.00
4" Drain	L.F.	1,655	5.00	8,275.00
18" Pipe	L.F.	130	16.00	2,080.00
Site Prep.	L.S.	1	100.00	100.00
Lime @ 10 T/A	Acre	4.1	335.97	1,377.50
Lime @ 25 T/A	Acre	2.4	677.08	1,625.00
Revegetation	Acre	13.2	553.41	7,305.00
3-Wire Fence	L.F.	8,295	1.00	8,295.00
R & R Fence	L.F.	180	1.00	180.00
Backfill Subsid.	EA.	1	250.00	250.00
Wetland Treatment Sys.	EA.	1	4,500.00	4,500.00
Hay Application	TON	6.1	150.00	915.00
24" Culvert	L.F.	20	14.50	290.00
<u>TOTAL</u>				\$137,688.00

NOTE: Estimated cost per unit for lump sum items were calculated using the estimated quantities shown in the specifications.



IV. SUMMARY OF JOB

The Five Sites - Centerville Area project accomplished all of the reclamation objectives. All hazardous subsidences and mine adits were permanently sealed, all mine waste areas were reclaimed and revegetated, and the acid mine discharge problem was addressed with appropriate measures. A portion of the AMD from the Senior Center site was collected and piped to an artificial wetlands system constructed below the site. The wetlands system consisted of a small (1250 sq.ft.) pond lined with Bentonite and filled with 1-1/2-2" of peat moss. The inlet pipe entered below the peat and was distributed by a network of perforated pipes. This was done in an effort to eliminate channelling and short circuiting of the discharge through the peat. At this time, the pond is still being filled and the water has not reached the overflow pipe. One item that should have been added to the system was a monitoring valve on the pipe coming into the peat bog. The flow into the bog is about 1/2 gpm, but there is no way to tell if the flow becomes diminished due to leakage, iron buildup, or pipe breakage.

There are several items of construction and design that could have been improved on this project as noted below:

- Hay mulch is effective on flat ground, where it can be crimped with a machine specifically designed for that purpose, but is not suitable for sloped areas. Track grousers do not effectively anchor the hay into the ground. Additionally, 2000 lb/acre is not sufficient for hay application as compared to straw mulch. The hay is much denser and must be applied at 3500 lb/acre for good coverage. Hydromulch is much easier to monitor and provides a much more even application than hay.
- After watching the various types of seeders (Double Disc, Hoe, Brillion, Broadcast) operate, it is obvious that the Brillion does a superior job of seeding. Seed depth and coverage are consistent with the Brillion and it also has less chance of plugging up or losing tubes. The Brillion also leaves the ground surface with a nicer finish which is both firmer and smoother.
- A portion of the project involved lowering an existing phone cable 7-8' deeper in the ground. Unfortunately, the phone company did not have that particular cable on hand and could not lower the cable, which forced a redesign of the contouring plan. It is important not to assume that all phone cables can be disturbed or moved when designing these projects.

The above mentioned items would have improved this project. The landowners of the various sites, however, are very happy with the results. The Centerville Park Board is especially pleased that the project was able to provide all of the dirtwork, grading and seeding for their new Park area by incorporating it into the reclamation plan. The Park Board intends to build a ballfield, install picnic tables, and grass the site as funding becomes available.



ATTACHMENT I

ANALYSIS OF CONSULTANT COSTS

PROJECT NAME: Five Sites Centerville Area
PROJECT NO.: MONT A/E 87-46-105
DATE PREPARED: December, 1987

<u>SERVICE</u>	<u>AMOUNT</u>
ENGINEERING DESIGN	\$11,276
 SUBTOTAL ENGINEERING DESIGN:	 \$11,276
 CONSTRUCTION INSPECTION AND ADMINISTRATION September	 16,072
 SUBTOTAL CONSTRUCTION INSP. & ADMIN.	 \$16,072
TOTAL PROJECT ENGINEERING COST:	\$27,348
TOTAL CONSTRUCTION COST:	\$137,688

COST COMPARISON - PROJECT ENGINEERING/CONSTRUCTION

ENGINEERING DESIGN/CONSTRUCTION	8%
CONSTRUCTION INSP. & ADMIN./CONSTRUCTION	12%
TOTAL PROJECT ENGINEERING/CONSTRUCTION	20%

